

# EXERCISES

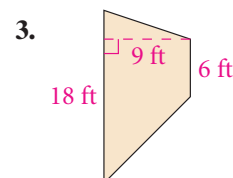
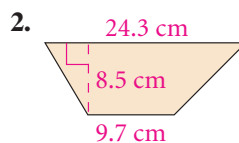
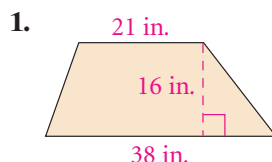
For more practice, see *Extra Practice*.

## Practice and Problem Solving

### A Practice by Example

**Example 1**  
(page 374)

Find the area of each trapezoid.

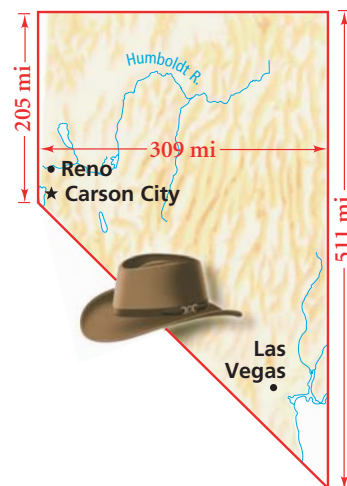


4. **Geography** Approximate the area of Nevada by finding the area of the trapezoid shown.

5. Find the area of a trapezoid with bases 12 cm and 18 cm and height 10 cm.

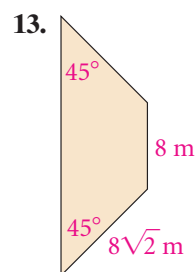
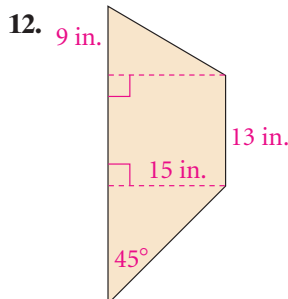
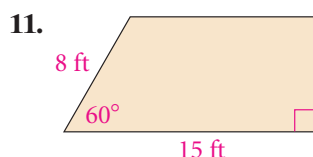
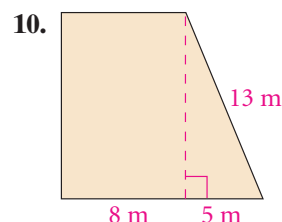
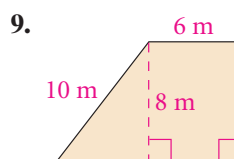
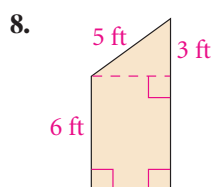
6. Find the area of a trapezoid with bases 2 ft and 3 ft and height  $\frac{1}{3}$  ft.

7. **Geography** The border of Tennessee resembles a trapezoid with bases 342 mi and 438 mi, and height 111 mi. Approximate the area of Tennessee by finding the area of this trapezoid.



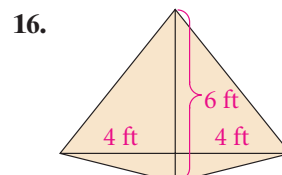
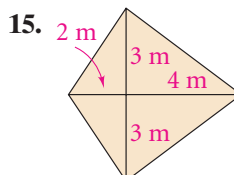
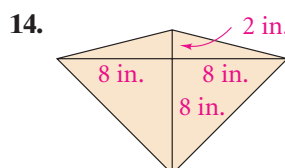
**Example 2**  
(page 374)

Find the area of each trapezoid. If your answer is not an integer, leave it in simplest radical form.



**Example 3**  
(page 375)

Find the area of each kite.

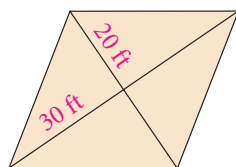


17. A kite has diagonals 7 ft and 16 ft. What is the area of the kite?

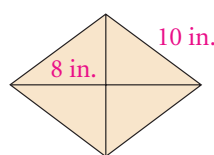
**Example 4**  
(page 375)

**Find the area of each rhombus.**

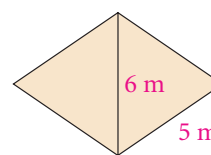
18.



19.



20.



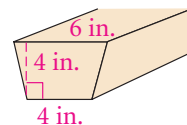
**B Apply Your Skills**

21. The end of the rain gutter has the shape of a trapezoid with the measurements shown. Find the area of this end.

22. A trapezoid has two right angles, 12-m and 18-m bases, and 8-m height.

- a. Sketch the trapezoid.      b. Find the perimeter.      c. Find the area.

23. **Open-Ended** Draw a kite. Measure the lengths of its diagonals. Find its area.



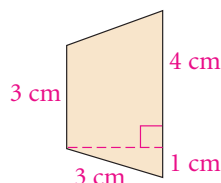
**Gold Bars** Find the area of each trapezoidal face of the gold bars.

24. End face: bases 4 cm and 2 cm, height 3 cm.

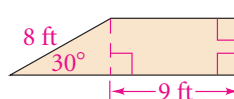
25. Side face: bases 8 cm and 5 cm, height 3 cm.

**Find the area of each trapezoid to the nearest tenth.**

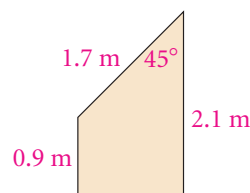
26.



27.

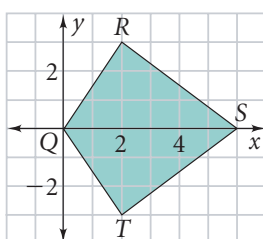


28.

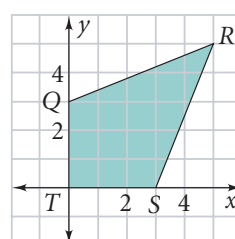


**Coordinate Geometry** In Exercises 29–32, find the area of quadrilateral  $QRST$ .

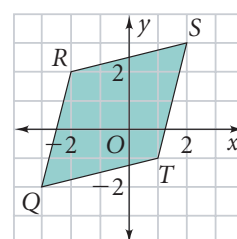
29.



30.



31.



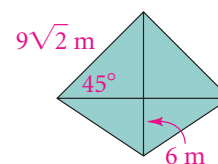
32.  $QRST$  has vertices  $Q(0,0)$ ,  $R(0,5)$ ,  $S(5,5)$ , and  $T(7,0)$ .

33. Find the area of the kite at the right.

34. a. **Coordinate Geometry** Graph the lines

$$x = 0, x = 6, y = 0, \text{ and } y = x + 4.$$

- b. What type of quadrilateral do the lines form?  
c. Find the area of the quadrilateral.

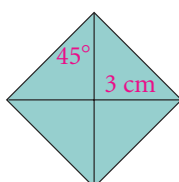


**Need Help?**

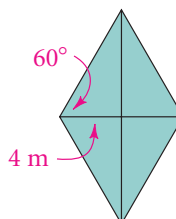
In Exercises 35–37, recall what is true about the diagonals of a rhombus.

**Find the area of each rhombus. Leave your answer in simplest radical form.**

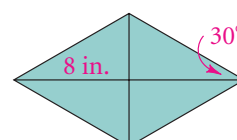
35.



36.



37.



38. Draw a trapezoid. Label its bases and height  $b_1$ ,  $b_2$ , and  $h$ , respectively. Then draw a diagonal of the trapezoid.
- Write equations for the area of each of the two triangles formed.
  - Writing** Explain how you can justify the trapezoid area formula using the areas of the two triangles.



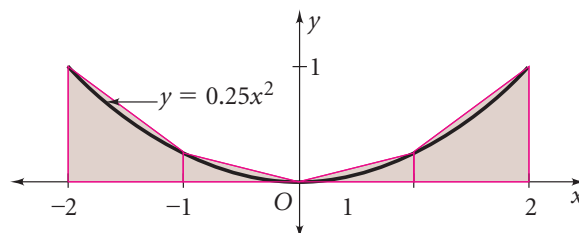
### Challenge



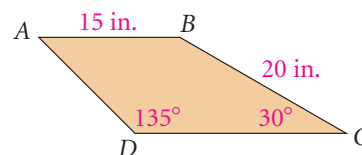
39. **Algebra** One base of a trapezoid is twice the other. The height is the average of the two bases. The area is  $324 \text{ cm}^2$ . Find the height and the bases. (Hint: Let the smaller base be  $2x$ .)



40. **Gravity Sports** Ty wants to paint one end of his homemade skateboarding ramp. The ramp is 4 m wide. Its surface is modeled by the equation  $y = 0.25x^2$ . Use the trapezoids and triangles shown to estimate the area to be painted.



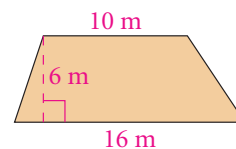
41. In trapezoid  $ABCD$ ,  $\overline{AB} \parallel \overline{DC}$ . Find the area of  $ABCD$ .



## Standardized Test Prep

### Multiple Choice

42. The area of a kite is  $120 \text{ cm}^2$ . The length of one diagonal is 20 cm. What is the length of the other diagonal?
- 12 cm
  - 20 cm
  - 24 cm
  - 48 cm
43. What is the area of the trapezoid at the right?
- $39 \text{ m}^2$
  - $60 \text{ m}^2$
  - $78 \text{ m}^2$
  - $96 \text{ m}^2$



### Quantitative Comparison

Compare the boxed quantity in Column A with the boxed quantity in Column B. Choose the best answer.

- The quantity in Column A is greater.
- The quantity in Column B is greater.
- The two quantities are equal.
- The relationship cannot be determined from the information given.

#### Column A

#### Column B

44.

the area of a kite with 10-in. and 12-in. diagonals

the area of a rhombus with 10-in. and 12-in. diagonals

45.

the area of a rhombus with sides of length 5 cm

the area of a kite with 5-cm and 6-cm diagonals

46.

the area of a triangle with an 8-m base and a 10-m height

the area of a rhombus with congruent 9-m diagonals



### Take It to the NET

Online lesson quiz at [www.PHSchool.com](http://www.PHSchool.com)

Web Code: afa-0704

## Short Response

47. The area of an isosceles trapezoid is  $160 \text{ cm}^2$ . Its height is 8 cm and the length of one leg is 10 cm.
- Draw and label a diagram representing the given information.
  - Find the length of each base. Show your work.

## Mixed Review

### Lesson 7-3

48. The hypotenuse of an isosceles right triangle has length  $50\sqrt{2}$  in. Find the area of the triangle.
49. A diagonal of a square is 10 units. Find the length of a side of the square. Leave your answer in simplest radical form.
50. The area of a square is  $20 \text{ cm}^2$ . Find the length of its diagonal to the nearest tenth.

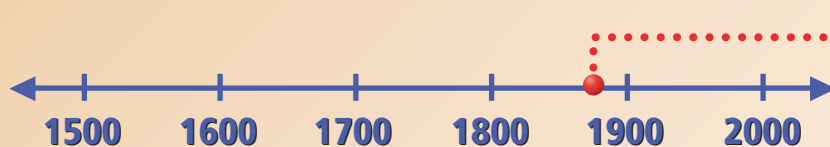
### Lesson 5-3

Fill in the blank with *always*, *sometimes*, or *never* to form a true statement.

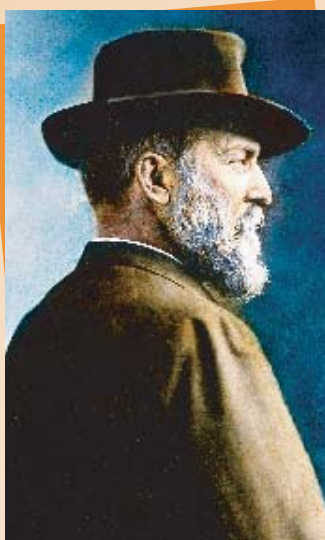
51. The incenter of a triangle   ? lies inside the triangle.
52. The orthocenter of a triangle   ? lies outside the triangle.
53. The centroid of a triangle   ? lies on the triangle.

### Lesson 3-4

54. Find the measure of an interior angle of a regular 9-gon.

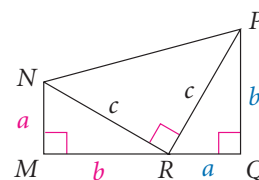


## A Point in Time



**Presidents** are known more often for their foreign policy than for their mathematical creativity. James Garfield, the 20th President of the United States, is an exception. In 1876, Garfield demonstrated this proof of the Pythagorean Theorem.

In the diagram,  $\triangle NRM$  and  $\triangle RPQ$  are congruent right triangles with sides of lengths  $a$ ,  $b$ , and  $c$ . The legs of isosceles right triangle  $NRP$  have length  $c$ . The three triangles form trapezoid  $MNPQ$ . The sum of the areas of the three triangles equals the area of trapezoid  $MNPQ$ .



Areas of Triangles = Area of Trapezoid

$$\frac{1}{2}ab + \frac{1}{2}ab + \frac{1}{2}c^2 = \frac{1}{2}(a+b)(a+b)$$

$$ab + \frac{1}{2}c^2 = \frac{1}{2}a^2 + ab + \frac{1}{2}b^2$$

$$\frac{1}{2}c^2 = \frac{1}{2}a^2 + \frac{1}{2}b^2$$

$$c^2 = a^2 + b^2$$



**Take It to the NET** For more information about Pythagorean Theorem proofs, go to **www.PHSchool.com**.

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